Dredging, Remediation, and Containment of CONTAMINATED SEDIMENTS

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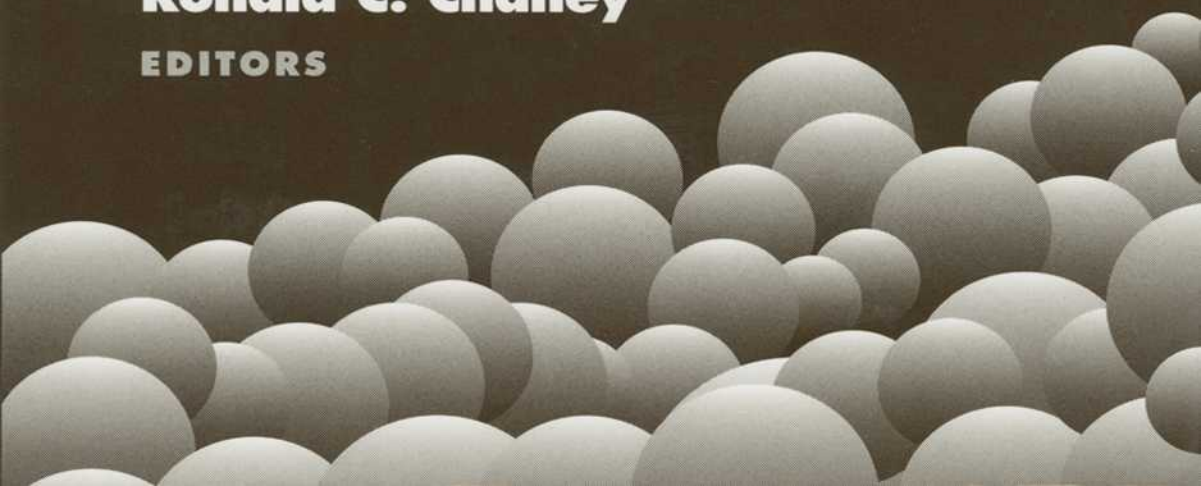

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Foreword

This publication, *Dredging, Remediation, and Containment of Contaminated Sediments,* contains papers presented at the symposium of the same name, held in Montreal, Quebec, Canada on 23–24 June 1994. The symposium was sponsored by ASTM Committee D–18 on Soil and Rock, in cooperation with Environment-Canada and the U.S. Environmental Protection Agency. Kenneth R. Demars, University of Connecticut, Storrs, CT; Gregory N. Richardson, G. N. Richardson and Associates, Raleigh, NC; Raymond N. Yong, McGill University, Montreal, Quebec, Canada; and Ronald C. Chaney, Humboldt State University, Arcata, CA served as co-chairmen of the symposium and are editors of the resulting publication.

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Management Strategies

Introduction

Prior to the 1960s, dredged material disposal alternatives were typically evaluated on the basis of economics or lowest cost rather than environmental impact. This generally meant open water disposal of harbor and channel sediments, and land (or wetland) disposal of river sediments. During the mid to late 1960s, questions were raised about the effects of dredging on water quality. In 1971 the Environmental Protection Agency (EPA) issued the report "Criteria for Determining Acceptability of Dredge Spoil Disposal to the National Waters" as the first effort to identify and classify polluted sediments in the nation's waterways for purposes of controlling dredging and disposal operations. The major concern at that time was to control nutrient loadings such as nitrogen and phosphorous, and sediment quality criteria were published before there was adequate scientific data to define the type and quantity of other contaminants that were associated with dredged material. Sediments that failed these criteria were considered unsuitable for open water disposal and required placement in a confined disposal facility (CDF). Since that time the EPA criteria for classifying polluted sediments has expanded to include numerous heavy metals and PCBs, with the sediment quality criteria undergoing frequent updating. While the development of these criteria was expected to have a positive effect on human health and well-being, they have significantly slowed the process and increased the cost of dredging clean sediments from the nation's waterways.

Thus, there is a need to develop new standards related to dredging or to modify existing standards in an effort to make the dredging of clean sediments and the remediation process for contaminated sediments more efficient. The primary objective of this symposium was to identify tests, methods, procedures, and materials, used in support of dredging, treatment, and containment of contaminated sediments, that are in need of standardization. A secondary objective was to provide a forum for discussion of past dredging practices and future directions including the effects of sediment properties and behavior, equipment requirements, and the impact of regulations.

ASTM sponsored a two-day symposium to fulfill these objectives. The symposium was held on 23–24 June 1994 during the regular committee week in Montreal, Quebec, Canada. Financial assistance for this symposium was provided by the Environment Canada: Contaminated Sediment Removal Program; the U.S. Environmental Protection Agency: Great Lakes National Program Office; the Connecticut Sea Grant Program, and ASTM.

The symposium was organized into five sessions of approximately equal length which consisted of brief individual presentations. Four of the sessions started with state-of-the-art presentations, as summarized below:

1. *Sediment Characterization*—Raymond N. Yong, McGill University, Montreal, Quebec.
2. *Dredging Technologies*—John B. Herbich, Texas A&M University, College Station, TX.
3. *Treatment Technologies*—Stephen Garbaciak, U.S. EPA Great Lakes National Program Office, Chicago, IL.
4. *Containment and Isolation Technologies*—Gregory N. Richardson, G. N. Richardson and Assoc., Raleigh, NC.
5. *Management Strategies*—This session included four brief presentations followed by a panel discussion. The discussants were Rosa Galvez-Cloutier of McGill University; Michael R. Palermo of the U.S. Army Engineer Waterways Experiment Station; Sandra M. C. Weston

of Environment Canada; and Howard Zar of the U.S. Environmental Protection Agency. These individuals were led in the panel discussion by G. N. Richardson. Moderators for the four sessions included R. J. Ebelhar of RUST Environmental and Infrastructure, Cincinnati, OH; J. P. Pelletier of Environment Canada, Toronto, Ontario; D. M. Petrovski of USEPA, Chicago, IL; and P. Selvadurai of McGill University, Montreal, Quebec.

All of the state-of-the-art presentations and the majority of the volume papers presented at the symposium are published in this volume. This volume is divided into five parts of roughly equal length and generally follows the symposium format as outlined above. The book starts with a brief summary paper by the editors. The first four parts follow the symposium format outlined above and each part starts with a state-of-the-art paper followed by the other related papers presented at the symposium. The final part on Management Strategies provides a review of the regulations and environmental factors that drive the sediment remediation process and technology development.

It is obvious from a review of the manuscripts that the process of remediating a site with contaminated sediments is very difficult, complex, and multidisciplinary in nature and that existing regulations, in many respects, often complicate the problem. While regulations specify the criteria for defining a hazardous material, it is not clear how to sample and test a submerged site to define the spatial extent of pollutants, how to select and operate the appropriate dredge, how to treat or contain and isolate the polluted sediments, and finally how to monitor and verify that target levels have been attained. While there has been a small number of contaminated sediment remediations and demonstrations to date, this field is still in its infancy and is likely to increase in importance in the future. It is believed by the editors that the papers in this volume provide a unifying, yet introductory, view of this topic and should remain a valuable reference in the years to come. It is hoped that this book will be a basis for development of standardized tests and equipment for the aquatic environment and will provide a stimulus for future research and innovation in remediation of sites with contaminated sediments.

The editors would like to express their thanks for the contributions of the symposium participants/authors and technical reviewers and would like to acknowledge the support and encouragement provided by ASTM staff and officers of Committee D–18 on Soil and Rock to make this effort a success.

The Editors

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